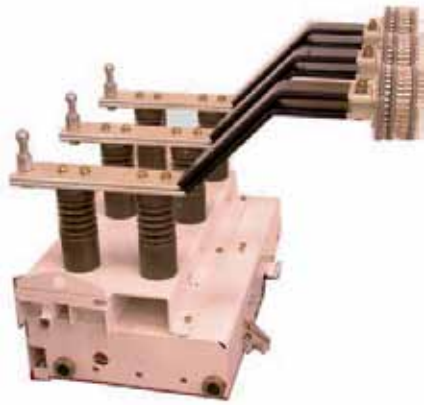
Medium Voltage Distribution

PIX

12-17.5 - 24kV Special Moving Parts

Injection & Visit Instructions



Schneider Electric

Contents

1 Schneider Electric at your service 3
1.1 Your contacts 3
2 With regards to this User Manual 4
2.1 Responsibilities 4
2.2 Reminder concerning normal operating conditions (in accordance with IEC 60694) 4
*Temperature ambient admissible 4
*Installation altitude 4
*Atmospheric pollution 4
*Permissible atmospheric humidity level 4
2.3 Eco-design concept and revalorisation of the materials used 5
2.4 Particular instructions for operation and intervention with energized equipment 5
2.5 Conventional symbols 5
2.6 Tightening torques for standard assemblies (bolt + nut) 6
3 Moving part for injection 7
3.1 Use 7
3.2 Sizes and approximate weights of the injection moving parts to be fitted in place of a ”SF6 outgoing feeder” 7
3.3 Sizes and approximate weights of the injection moving parts to be fitted in place of a ”Vacuum outgoing feeder” 8
4 Handling - Transport 10
4.1 Handling the injection moving part 10
4.2 Special precautions 10
4.3 Handling the inspection visit moving part 11
4.4 Special precautions 12
5 1250 A injection moving part 13
5.1 Preparation of the moving part for ”cable tests” 13
5.2 Preparation of the moving part for ”busbar testing” 15
6 3150 A injection moving part 17
6.1 Preparation of the moving part for ”cable testing” 17
6.2 Preparation of the moving part for ”busbar testing” 19
7 Using the injection moving part 21
7.1 Fitting the moving part into its functional unit 21
7.2 Connections for test operations 24
7.3 Earthing of the functional units equipped with the ”earthing” option 24
8 Use of the inspection visit moving part 25
8.1 Fitting the moving part into the functional unit 25
8.2 Possibility of earthing using an earthing block 26
9 Storage of a moving part 27
9.1 Specific instructions for storage 27
9.2 Storage 27

PIX

1 Schneider Electric at your service

Electrical equipment necessitates a particular attention and scrupulous respect of the recommendations explained in this user manual. Operation and maintenance may only be carried out by qualified person nel who have received suitable authorisation for the operations and manoeuvres they are responsible for performing.

Schneider Electric's After-Sales Service, which is the nearest to you, is at your disposal for any type of aid or advice.

Reminder : All locking-out operations must be performed according to the "General Safety Instructions booklet for Electrical Applications" and the particular regulations for the network concerned.

1.1 Your contacts

France:
Schneider Electric Equipo de interrupción Tensión Media Bd de la Résistance BP 84019 F-71040 Mâcon Cedex 9
Tel. : 33 (0) 3 85 29 35 00
Fax : 33 (0) 3 85 29 36 30
Freefone N° : 0 800 40 27 62 24hrs/day 7days/week

Germany:
Schneider Electric Sachsenwerk Königsbrücker Strasse 124, D-01099 Dresden
Tel. : + 49 (0) 351 8200
Fax : + 49 (0) 351 820 2342

Belgium:
Schneider Electric Belgium S.A. Route Zénobe Gramme, 33 Zoning des Plénesses B-4821 Dison
Tel. : + 32 (0) 87 320 350
Fax : + 32 (0) 87 320 405

United Kingdom:
Schneider Electric Frederick Road, Salford, M6 6QH, Inglaterra
Tel. : + 44 (0) 161 745 9090
Fax : + 44 (0) 161 745 4482

Switzerland:
Schneider Electric Carl-Sprecher-Strasse 3 CH-5036 Oberentfelden
Tel. : + 41 (0) 6 27 37 33 33
Fax : + 41 (0) 6 27 37 36 77

2 With regards to this User Manual

© - Schneider Electric- 2011. Schneider Electric, the Schneider Electric logo and their figurative forms are Schneider Electric registered trade marks. The other trademarks men tioned in this document, registered or not, belong to their respective holders. The other brand names mentioned within this document, whether they be copyright or not, belong to their respective holders.

2.1 Responsibilities

Our devices are quality controlled and tested at the factory in accor dance with the standards and the regulations currently in force.
Apparatus efficiency and apparatus life depend on the compliance with the installation, commissioning and operation instructions described in this user manual. Non respect of these instructions is likely to invali date any guarantee.
The texts in this user manual make reference to French regulations.
Local requirements especially about safety which are in accordance with the indications given in this document, must be observed.

Schneider Electric declines any responsibility for the consequences:

- Due to the non respect of the recommendations in this manual which make reference to the international regulations in force.
- Due to the non respect of the instructions by the suppliers of cables and connection accessories during installation and fitting operations,
- any possible aggressive climatic conditions (humidity, pollution, etc.) acting in the immediate environment of the materials that are neither suitably adapted nor protected for these effects.

This user manual does not detail the lockout procedures that must be applied. The interventions described are carried out on de-energised equipment (in the course of being installed) or locked out (non operational).

2.2 Reminder concerning normal operating conditions (in accordance with IEC 60694)

Temperature ambient admissible

The ambient air temperature should be comprised between - 15°C and + 40° C.
The average measured value for a 24 hour period must not exceed 35°C.

Installation altitude

HV equipment can be used up to an altitude of 1,000 m.
Beyond this, account must be taken of the decrease in dielectric withstand. It will therefore be necessary to use appropriately insulated substations.

Atmospheric pollution

There must be no dust particles, fumes and smoke, corrosive or flammable gases, vapours or salts.

Permissible atmospheric humidity level

The average value of atmospheric humidity in a 24 hour period must not exceed 95 %.
The average value of water vapour pressure over a period of 24 hours must not exceed 22 mbar.
The average atmospheric relative humidity value measured over a period of one month must not exceed 90 %.
The average water vapour pressure over a period of one month must not exceed 18 mbar.

2 With regards to this User Manual (contd.)

Condensation may appear in case of any sharp variation in tempera ture, due to excessive ventilation, a high atmospheric humidity level or the presence of hot air. This condensation can be avoided by an appropriate layout of the room or of the building (suitably adapted ventilation, air driers, heating etc.).
Whenever the humidity level is higher than 75%, we recommend that you take appropriate corrective measures for which Schneider Electric can offer you the necessary assistance. Please do not hesitate to contact us.

2.3 Eco-design concept and revalorisation of the materials used

The design and manufacture of our packaging are both in conformity with the French government decree N° 98-638 of 20 July 1998, concerning the account that is taken of environmental requirements.

2.4 Particular instructions for operation and intervention with energized equipment

When commissioning and opera ting the equipment under normal conditions, the General safety instructions for electrical applications must be respected, (protective glo ves, insulating stool, etc.), as well as the operating instructions. All operations must be completed once started.

2.5 Conventional symbols

Code for a product recommended and marketed by Schneider Electric

Value of the tightening torque
Example: **1.6 daN.m**

Mark corresponding to a legend

CAUTION! Remain vigilant!
Precautions to be taken in order to avoid any accident or injury

FORBIDDEN! Do not do it!
The compliance with this indication is compulsory, non compliance with this stipulation may damage the equipment.

INFORMATION - ADVICE
Your attention is drawn to a specific point or operation.

2 With regards to this User Manual (contd.)

2.6 Tightening torques for standard assemblies (bolt + nut)

Threaded fasteners without grease:assembly with ungreased washers.
Threaded fasteners with grease:assembly with greased washers.
Use grease referenced:

Dimensions	Zinc plated steel fasteners without grease (daN.m)		Stainless steel fasteners with grease (daN m) grease (daN.m)
	Class 6.8	Class 8.8	A2-70
M 4	0.2	0.3	0.2
M 5	0.4	0.5	0.4
M 6	0.7	0.9	0.7
M 8	1.6	2.1	1.6
M 10	3.2	4.3	3.2
M 12	5	6.6	5
M 14	8.7	11.6	8.7
M 16	13.4	17.9	13.4
M 20	26.2	35	26.2

3 Moving part for injection

3.1 Use

The moving part for injection purposes has several utilities

- Busbar measurement and tests,
- Cable measurement and tests,
- Unlocking the shutters.

Special use for earthing a busbar or cables.

Only use this injection moving part after proper and regular locking out of the switchboard.

3.2 Sizes and approximate weights of the injection moving parts to be fitted in place of a ”SF6 outgoing feeder”

12 kV - SF6	Marked	630/800 A		1250/1600 A		2000 A	2500 A	3150 A
Width of functional unit	-	650	800	650	800	1000	1000	1000
Width of trolley (mm)	L	535	NOT AVAILABLE, DEVELOPED TO ORDER	535				
Depth of trolley (mm)	P	686.5		686.5				
Height in position "busbar tests" (mm)	$H1^{\pm1}$	547.5		547.5		NOT AVAILABLE, DEVELOPED TO ORDER		
Height in position "cable tests" (mm)	$H2^{\pm1}$	207.5		207.5				
Racking-in contacts	C	Clamps		Clamps		60 Tulips		80 Tulips
Distance between phases (mm)	E	180	210	180	210	$254^{\pm1}$	$254^{\pm1}$	$254^{\pm1}$
Approximate Weight (kg)	-	?		?				

17.5 kV - SF6	Marked	630/800 A	1250/1600 A	2000 A	2500 A
Width of functional unit	-	800	800	1000	1000
Width of trolley (mm)	L	625	625		
Depth of trolley (mm)	P	786.5	725		
Height in position "busbar tests" (mm)	$H1^{\pm1}$	547.5	547.5	NOT AVAILABLE, DEVELOPED TO ORDER	
Height in position "cable tests" (mm)	$H2^{\pm1}$	207.5	207.5		
Racking-in contacts	C	Clamps		60 Tulips	80 Tulips
Distance between phases (mm)	E	210	210	$254^{\pm1}$	$254^{\pm1}$
Approximate Weight (kg)	-				

24 kV - SF6	Marked	630/800 A	1250/1600 A	2000 A	2500 A
Width of functional unit	-	800	800	1000	1000
Width of trolley (mm)	L				
Depth of trolley (mm)	P		NOT AVAILABLE, DEVELOPED TO ORDER		
Height in position "busbar tests" (mm)	$H1^{\pm1}$				
Height in position "cable tests" (mm)	$H2^{\pm1}$				
Racking-in contacts	C	Clamps		60 Tulips	80 Tulips
Distance between phases (mm)	E	210	210	$254^{\pm1}$	$254^{\pm1}$
Approximate Weight (kg)	-				

3 Moving part for injection

(contd.)

3.3 Sizes and approximate weights of the injection moving parts to be fitted in place of a ”Vacuum outgoing feeder”

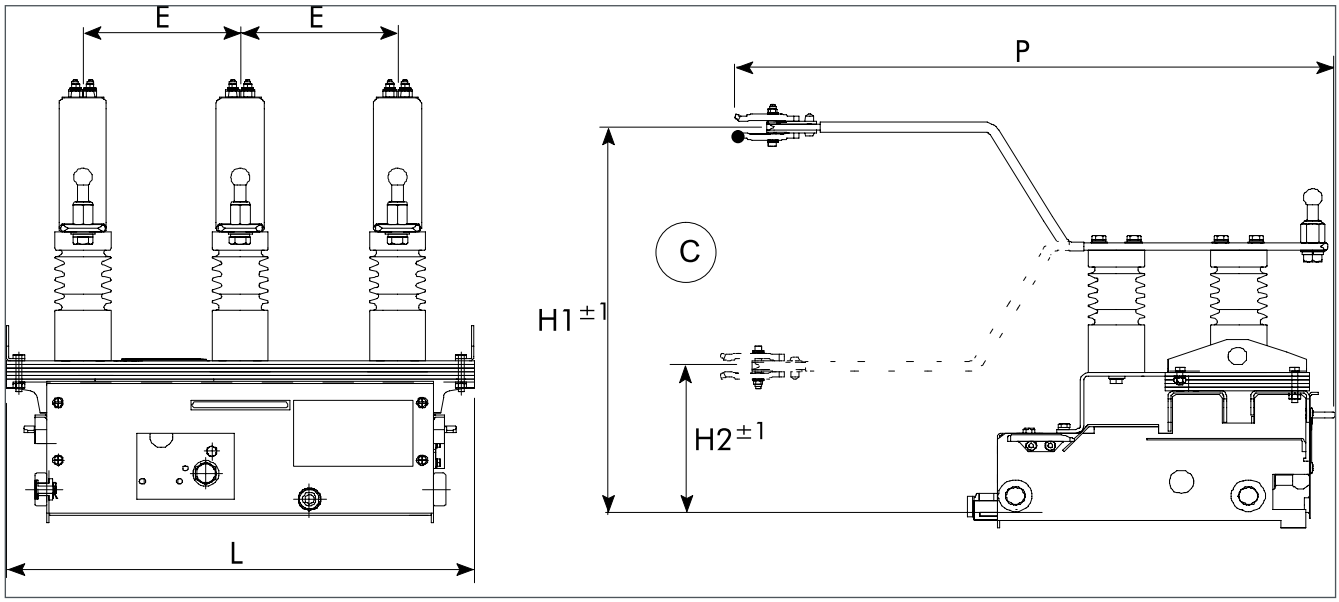
12 kV - Vacuum	Marked	630/800 A		1250 A		1600 A	2000 A	2500 A	3150 A
Width of functional unit	-	650	800	650	800	800	800	1000	1000
Width of trolley (mm)	L	535	NOT AVAILABLE,	535	NOT AVAILABLE,	625	625	810	810
Depth of trolley (mm)	P	686.5		686.5		686.5	686.5	683.5	683.5
Height in position "busbar tests" (mm)	H1±1	547.5		547.5		547.5	547.5	547.5	552.5
Height in position "cable tests" (mm)	H2±1	207.5		207.5		207.5	207.5	207.5	212.5
Racking-in contacts	C			Clamps				60 Tulips	80 Tulips
Distance between phases (mm)	E	180	210	180	210	210	210	254±1	254±1
Approximate Weight (kg)	-								

17.5 kV - Vacuum	Marked	630/800 A	1,250 A	1600 A	2000 A	2500 A	3150 A
Width of functional unit (mm)	-	750	750	750	750	1000	1000
Width of trolley (mm)	L	625	625	NOT AVAILABLE,	DEVELOPED TO ORDER	810	810
Depth of trolley (mm)	P	786.5	786.5			683.5	755
Height in position "busbar tests" (mm)	H1±1	547.5	547.5			547.5	571.5
Height in position "cable tests" (mm)	H2±1	207.5	207.5			207.5	231.5
Racking-in contacts	C		Clamps			60 Tulips	80 Tulips
Distance between phases (mm)	E	210	210	210	210	254±1	254±1
Approximate Weight (kg)	-	?	?				?

24 kV - Vacuum	Marked	630/800 A	1,250 A	1600 A	2000 A	2500 A
Width of functional unit	-	800	800	800	1000	1000
Width of trolley (mm)	L					
Depth of trolley (mm)	P					
Height in position "busbar tests" (mm)	H1±1		NOT AVAILABLE, DEVELOPED TO ORDER			
Height in position "cable tests" (mm)	H2±1					
Racking-in contacts	C		Clamps			60 Tulips
Distance between phases (mm)	E	210	210	210	254±1	254±1
Approximate Weight (kg)	-					

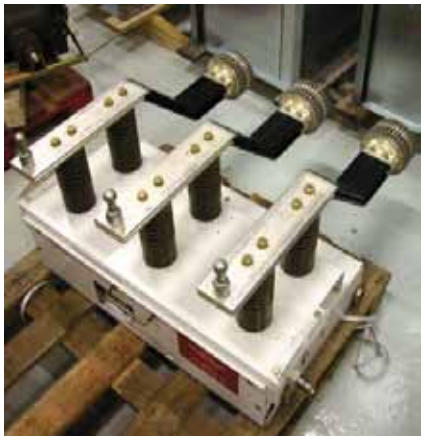
3 Moving part for injection

(contd.)



Example:
1250 A Moving Part

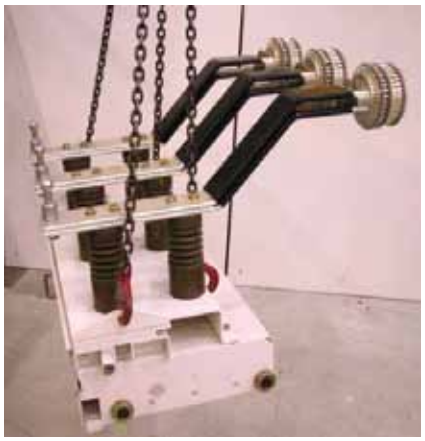
4 Handling - Transport



4.1 Handling the injection moving part

- Moving part fixed to a pallet, for transport by a forklift truck.

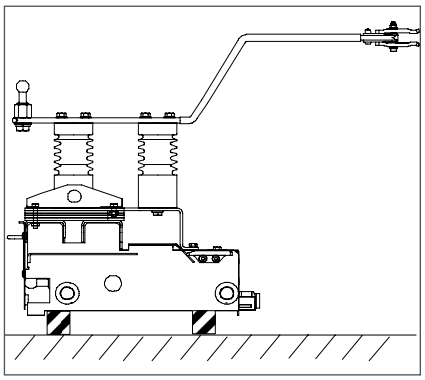
- Using a chain hoist, lift the moving part up by its 4 slinging points.



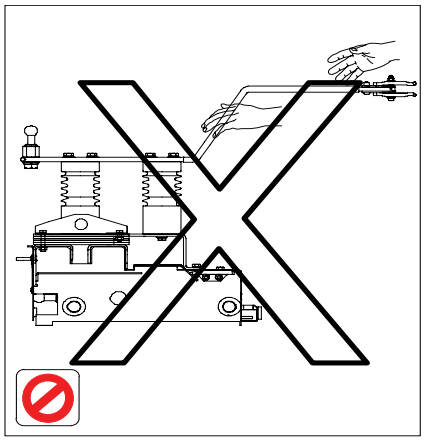
- Place the moving part on the handling table.

4.2 Special precautions

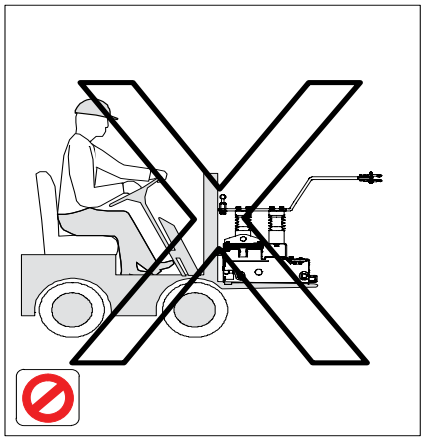
- This moving part does not roll. On the ground, it must be placed on 2 wooden battens.



4 Handling - Transport (contd.)



- Never handle the injection moving part by the connecting plates.



- Never lift the injection moving part by taking it from under its trolley.

4.3 Handling the inspection visit moving part

- Two lugs have been provided for slinging.

- Using a chain hoist, lift the moving part up by its 2 slinging points.
- Place the moving part on the handling table.

4 Handling - Transport (contd.)

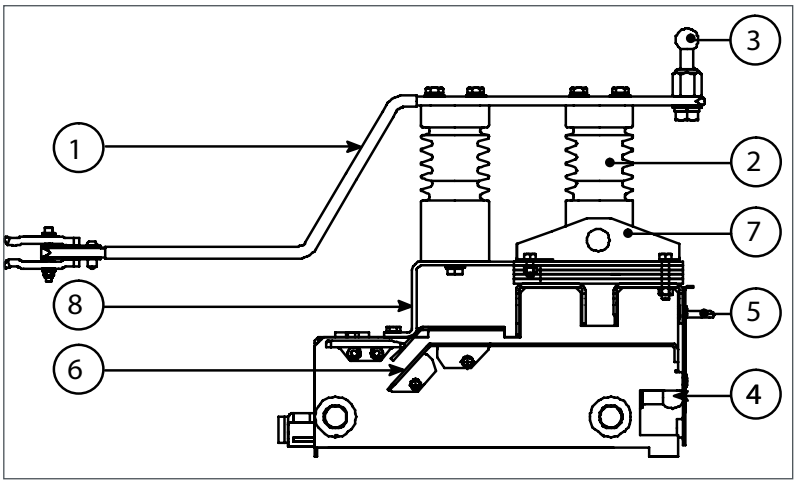
- Lower the 2 lugs when the moving part has been placed on the table.

4.4 Special precautions

- This moving part does not roll.

On the ground, it must be placed on 2 wooden battens.

5 1250 A injection moving part



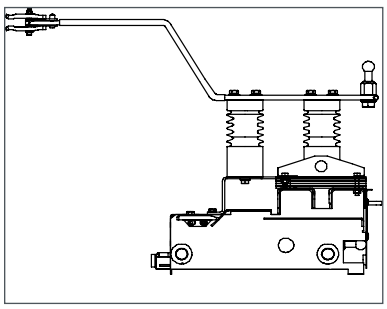
Legend

1 Removable test bars
2 Fixed insulator supports
3 ARCUS test contact balls
4 ARCUS earthing ball
5 Handling handle
6 Ramp for lifting the shutters
7 Lifting bracket
8 Other lifting points

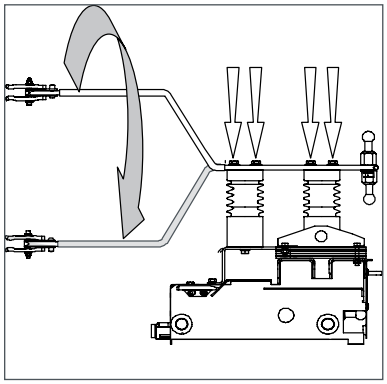
5.1 Preparation of the moving part for ”cable tests”

The moving part is delivered in the position requested by the customer

To transform a ”busbar testing” moving part to a ”cable testing” moving part, follow the following indications precisely. Also refer to tables § 3.2 or 3.3.



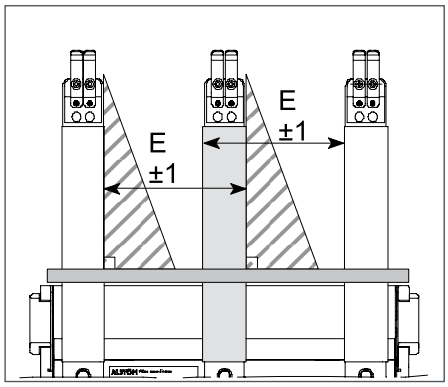
- moving part in the ”busbar testing” position.



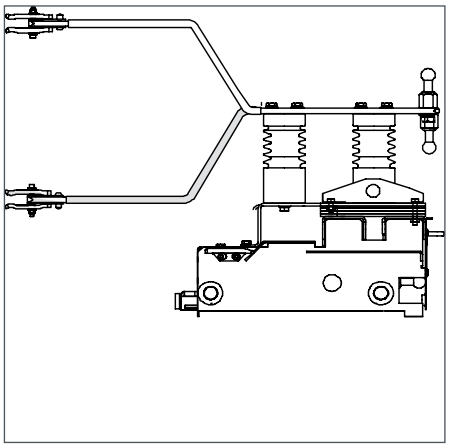
- Dismantle the busbar from the central phase (4 screws).
- Turn the bar round and set it in place.

5 1250 A injection moving part

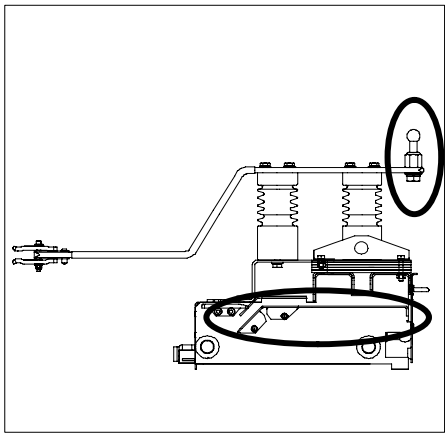
(contd.)



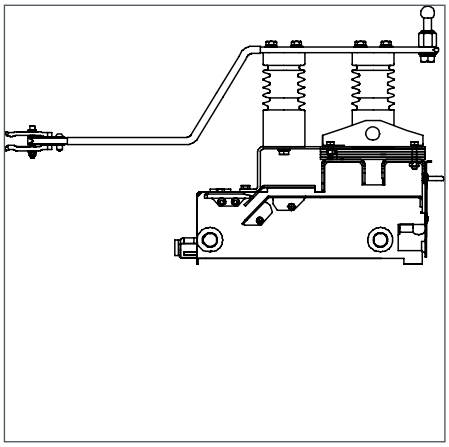
- Position the bar.
- Respect the squaring positions using a rule resting on the outer bars.



- Tighten the bar.
- Proceed in exactly the same way for the 2 other phases (always tighten the bar before removing the following one).



- Dismantle and turn round the ARCUS test balls.
- Dismantle the lifting ramp from the shutters and remount it on the left-hand side of the moving part (2 H M8x20 bolts).



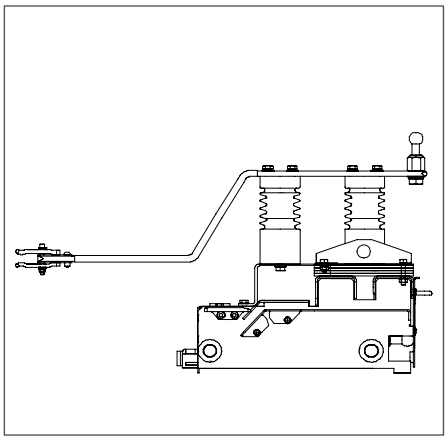
- ”Cable testing” moving part now ready for use

5 1250 A injection moving part

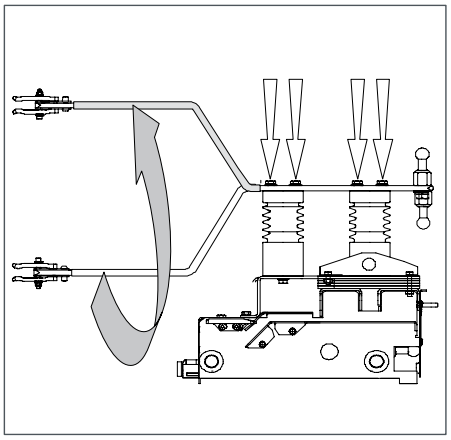
(contd.)

5.2 Preparation of the moving part for ”busbar testing”

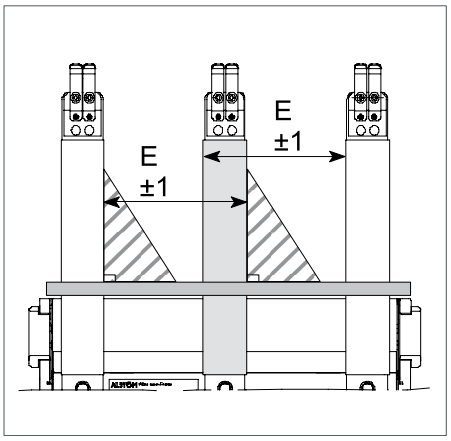
To transform a ”cable testing” moving part to a ”busbar testing” moving part, follow the following indications very precisely. Also refer to tables § 3.2 or 3.3.



- Moving part in the ”cable testing” position.



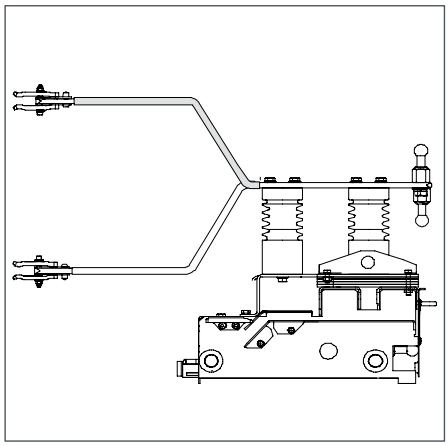
- Dismantle the busbar from the central phase (4 screws).
- Turn the bar round and set it in place.



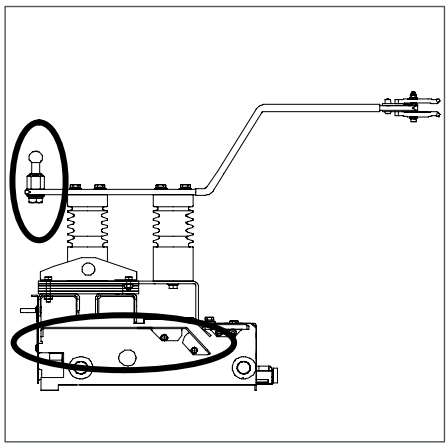
- Position the bar.
- Respect the squaring positions using a rule resting on the outer bars.

5 1250 A injection moving part

(contd.)



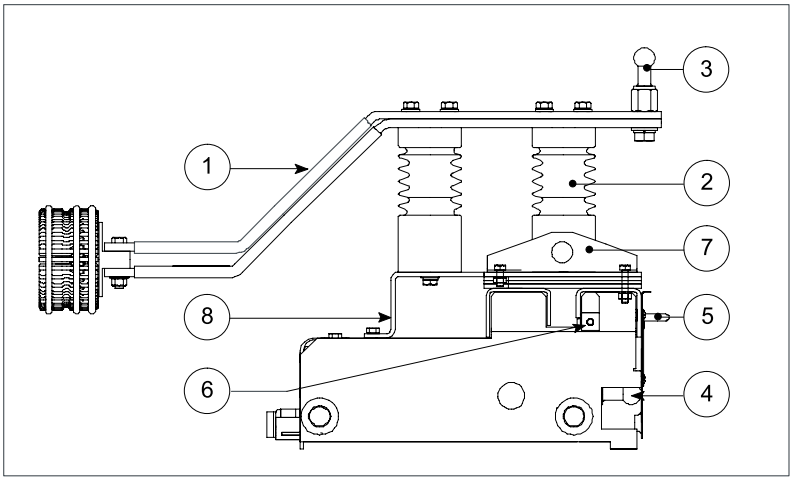
- Tighten the bar.
- Proceed in exactly the same way for the 2 other phases (always tighten the bar before dismantling the following one).



- Dismantle and turn round the ARCUS test balls.
- Dismantle the lifting ramp from the shutters and remount it on the right-hand side of the moving part (2 H M8x30 bolts).

- Moving part in the ”busbar testing” position now ready for use.

6 3150 A injection moving part

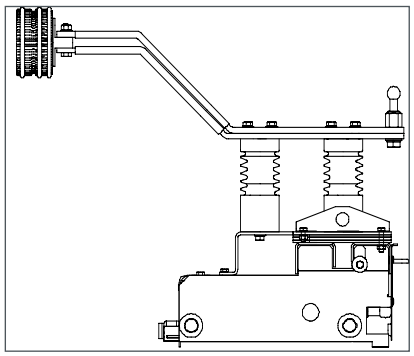


Legend
1 Removable test bars
2 Fixed insulator supports
3 ARCUS test contact balls
4 ARCUS earthing ball.
5 Handling handle
6 Location of the shutter lifting system
7 Lifting bracket
8 Other lifting points

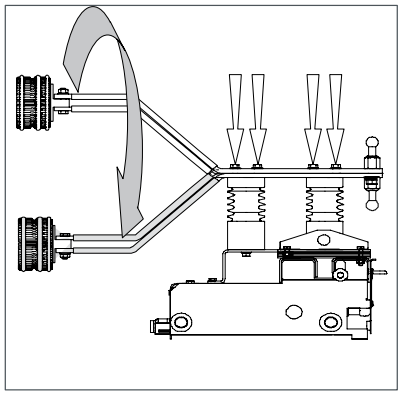
6.1 Preparation of the moving part for ”cable testing”

The moving part is delivered in the position requested by the customer.

To transform a ”busbar testing” moving part to a ”cable testing” moving part, follow the following indications pre cisely. Also refer to tables 3.2 or 3.3.



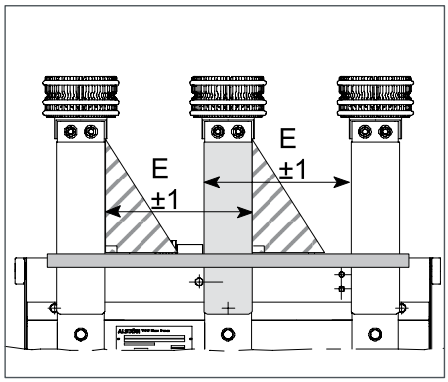
- Moving part in the ”busbar testing” position.



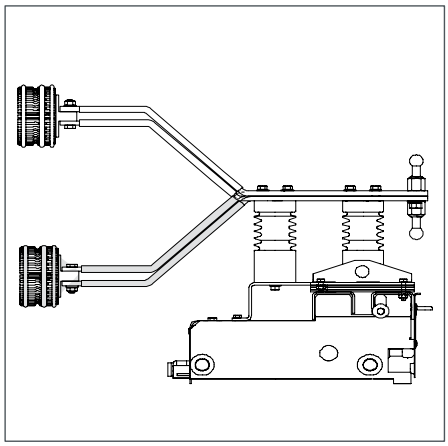
- Dismantle the busbar from the central phase (4 screws).
- Turn the bar round and set it in place.

6 3150 A injection moving part

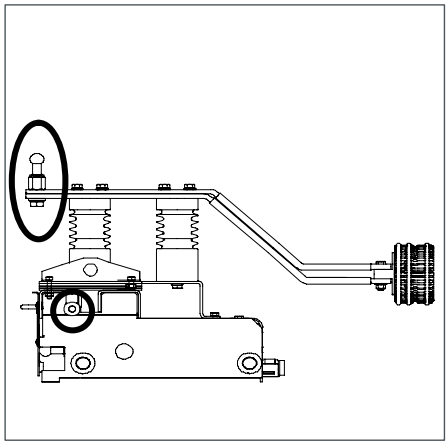
(contd.)



- Position the bar.
- Respect the squaring positions using a rule resting on the outer bars.



- Tighten the bar.
- Proceed in an identical way for the other 2 phases (tighten the bar before removing the next one).
- Inspect the E±1 dimension at the extremity of the busbars.



- Dismantle and turn round the ARCUS test balls.
- Dismantle the lifting shaft from the shutters and remount it on the right-hand side of the moving part

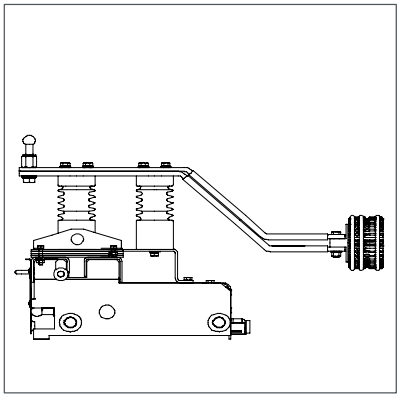
- ”Cable testing” moving part now ready for use

6 3150 A injection moving part

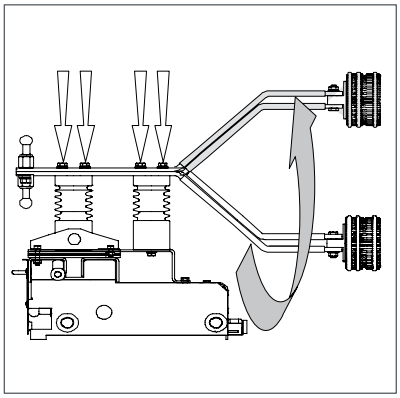
(contd.)

6.2 Preparation of the moving part for ”busbar testing”

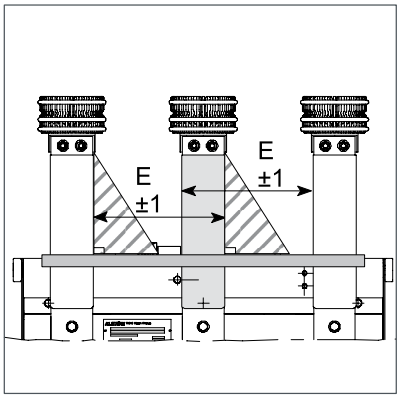
To transform a ”cable testing” moving part to a ”busbar testing” moving part, follow the following indications very precisely. Also refer to tables 3.2 or 3.3.



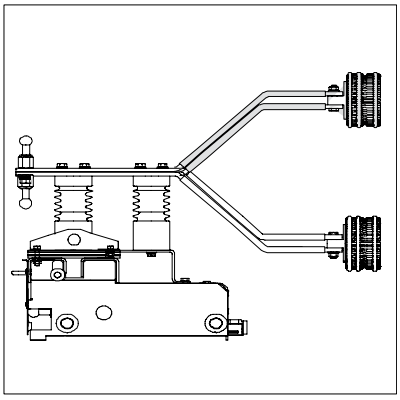
- Moving part in the ”cable testing” position.



- Dismantle the busbar from the central phase (4 screws).
- Turn the bar round and set it in place.



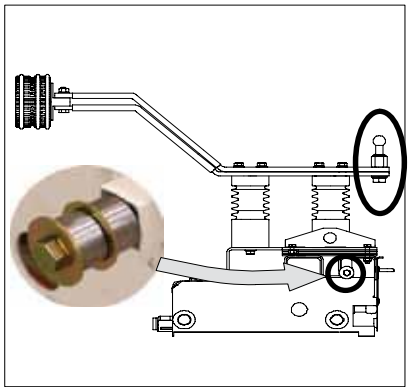
- Position the bar.
- Respect the squaring positions using a rule resting on the outer bars.



- Tighten the bar.
- Proceed in exactly the same way for the other 2 phases (tighten the bar before dismantling the next one).
- Inspect the E±1 dimension at the extremity of the bars.

6 3150 A injection moving part

(contd.)



- Dismantle and turn round the ARCUS test balls.
- Dismantle the lifting shaft from the shutters and remount it on the left-hand side of the moving part.

- Moving part in the ”busbar testing” position now ready for use.

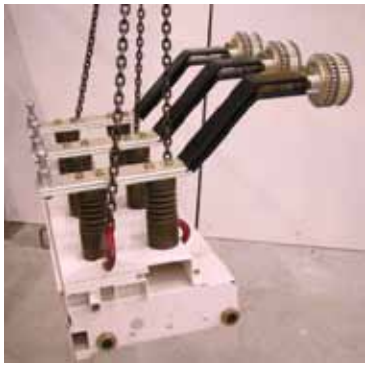
7 Using the injection moving part

7.1 Fitting the moving part into its functional unit

Tests can only be carried out if all of the operational and locking out operations have been respected.

The functional unit compartment (cables or busbar) being the subject of the test, must be **De- Energized**.

- Warning plate fixed to the moving part (elementary safety instructions).



- Lift up the moving part and place it on the handling table (see § 4.1).

- Fitting the moving part into its compartment (follow the instructions in User Manuals NoT056 & NoT060):
  - Open the door,
  - If necessary, extract the moving part already in place,
  - Fit in place the injection moving part,
  - Pull out the handling table.

- Injection moving part in the ”tests” position.

- Close the door

7 Using the injection moving part (contd.)

- Turn the handle downwards: the door descends and immobilises itself.
- Take the handle out.

- Turn the key in a clockwise direction: the door is locked.
- Take the key out.

Disengageable racking-in and drawing-out crank handle for the moving part.

Marking

Moving part with clamps:

--> end-piece

Moving part with clamps:

--> end-piece

- Engage the crank handle through the door.
- Turn it in the direction of the arrow.

- The CLACK of the disengagement of the crank handle indicates that the moving part is “racked-in”.
- Remove the crank handle.

7 Using the injection moving part (contd.)

- Insert the key into its keyhole.
- Turn it in an anti-clockwise direction.

- Insert the handle into its hole.
- Turn it upwards: the door lifts up.

- Open the door: the handle and the key remain captive.

- Injection moving part in the ”racked-in” position.

In this case, only the lower shutter is raised.

- **Proceed with locking-out operations (checking for absence of voltage).**

7 Using the injection moving part (contd.)

7.2 Connections for test operations

- Use the ARCUS balls to connect the cables necessary for the tests.

7.3 Earthing of the functional units equipped with the ”earthing” option

The use of the earthing system on the moving part is only possible for functional units equipped with the ”earthing” option on the racking-in travel.

- The ARCUS ball fixed to the trolley is directly connected to the functional unit’s earthing circuit.

- Example of the connection for earthing the cables on a functional unit.

8 Use of the inspection visit moving part

8.1 Fitting the moving part into the functional unit

Checks can only be carried out if all of the operational and locking out operations have been respected.

The functional unit compartment (cables or busbar) being the subject of the test, must be **De-Energized.**

- Lift the moving part and place it on handling table (See § 4.1).

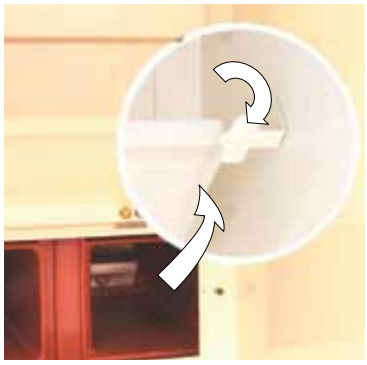
- Lift up the moving part and place it on the handling table (see NoT056 & NoT060) :
  - Open the door,
  - If necessary, extract the moving part already in place,
  - Fit in place the inspection visit moving part,
  - Pull out the handling table.

- Moving part in the ” tests” position.

- Rack-in the moving part.
- Remove the crank handle.

- Unlock the shutter using a key.
- Lift up and mechanically latch the shutter (see next photo).

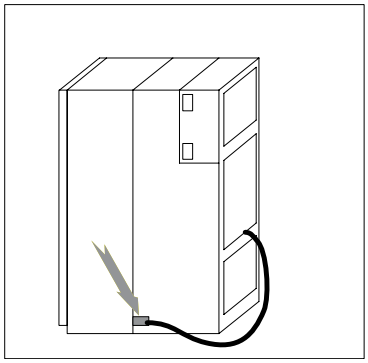
8 Use of the inspection visit moving part (contd.)



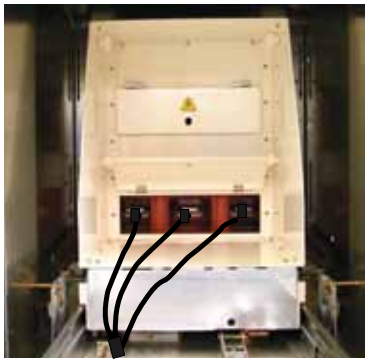
- Detail of the mechanical latching system:
  - lift the shutter,
  - Pivot the lug so that it is made to support the edge of the shutter.

- **Proceed with locking-out operations (checking for absence of voltage).**

8.2 Possibility of earthing using an earthing block



- Check there is an absence of voltage.
- Connect the longest extremity of the earthing block to the switchboard's general ground.



- Fix one of the three other extremities of the earthing block to each phase.

9 Storage of a moving part

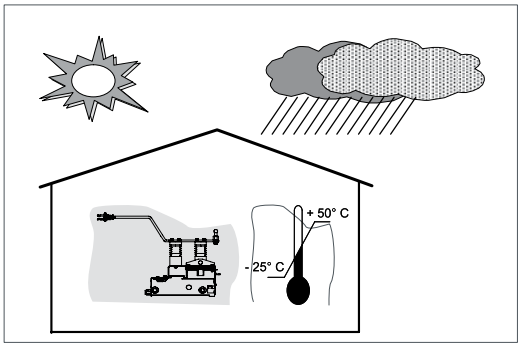
9.1 Specific instructions for storage

Cover the moving part with a translucent plastic cover. This in order to avoid handling an injection moving part by its racking-in arms.

Avoid leaving the material where it is likely to be subjected to large, sudden temperature changes.

Ensure that there are absolutely no corrosive vapours present, for example sulphur dioxide (SO_2).

9.2 Storage



The site chosen for storage must be capable of protecting the equipment against possible damage due to:

- Water
- Water vapour
- Saline atmosphere
- All types of pollution
- Micro-organisms.

Contact Schneider Electric for any derogations to these criteria

© 2011 Schneider Electric - All rights reserved

Schneider Electric
35, rue Joseph Monier
CS 30323
92506 Rueil-Malmaison Cedex, France

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

This document has been printed on ecological paper

Publishing: Schneider Electric
Design: Schneider Electric
Printing:

AMTNoT083-02

02-2011